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REMARKS

Informalities

The Office Action rejects claims 3 and 4 due to the lack of clarity in "AB...AB." In response, Applicants have amended the claims to omit the unclear terms.

Section 112 Objections

The Office Action rejects claims 1, 2 and 12 under 35 U.S.C. 112 because of use of the term "related." Applicants have omitted the term in the amended claims.

Section 103 Rejections

Claims 1-4, 6-8 and 12 are rejected under 35 U.S.C. 103(a) as unpatentable over Ohba et al. in view of Tischler et al. In response, Applicants have amended the claims to distinguish more clearly over the cited references.

Ohba teaches a method of using a single 3-8 nm thick AlN layer as a first buffer layer, followed by a relatively thick (50-1000 nm!) InN layer. This is a very different structure from that of the present application. Referring to the examples 1-4 of the present application, a minimum of three sets of two layers (six total layers) are described with each layer having a thickness in the range of 2-6 nm. Claims 1 and 12 of the present application have been amended to describe this distinction, describing at least three layers with each layer having a thickness in the range of 2-6 nm. Claims 13 and 14 have been added to limit the total buffer thickness to 96 nm as noted on line 8 of Example 1 in the specification, and to 48 nm as noted in the last line of the second paragraph of Example 1.

Referring now specifically to Tischler, the device described therein is very different from that described in claim 1. Tischler teaches the use of a strained layer super lattice for the growth of GaN based materials. A strained layer super lattice results in a strictly periodic lattice according to the definition of super lattice. The buffer of claims 1 and 12 is described as a periodic or non-periodic, amorphous or poly-crystalline structure, which is a description that will be understood by those skilled in the art as describing a structure very different from the strict periodic structure of the super lattice of Tischler. A super lattice requires a different processing method, and results in a different structure with a different performance. As a result, Ohba and Tischler cannot be combined to describe claims 1 or 12. It follows therefore, that the combination of Ohba and Tischler cannot describe the dependent claims 2-11 and 13-14 which add further limitations.

Neither Ohba nor Tischler teach or suggest the structures as now claimed in claims 1, 12, 13 and 14, and these claims are now believed to be allowable. Claims 2-4 and 6-8 add further limitations and are therefore also believed to be allowable.

The Office Action rejects claims 9-11 under 35 U.S.C. 103(a) as unpatentable over Ohba in view of Tischler and further in view of Edmond. Applicants have described the differences between Ohba and Tischler and the present application above in reference to amended claims 1 and 12. Claims 9-11 are dependent on claim 1 and are therefore also believed to be distinguishable as they add further limitations to allowable claims.

CONCLUSION

Applicants have amended the claims as required, and to more clearly distinguish them from the references, and believe they are now in condition for allowance.

If any further questions should arise prior to a notice of allowance, the Examiner is respectfully invited to contact the attorney at the number set forth below.

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Respectfully submitted,

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CERTIFICATE OF MAILING

I certify that the enclosed papers are being deposited with the U. S. Postal Service as first class mail in an envelope addressed to: BOX RESPONSE - FEE, Commissioner of Patents, Washington, D.C. 20231 on November 8, 2002, by Diana Dearing.

Diana Dearing

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APPENDIX

Version With Markings to Show Changes Made

In The Claims

Please amend the claims as follows:

1. (Once amended) A crystal growth method for the group-III nitride [and related] compound semiconductors, comprising:

forming a MOCVD-grown periodic or non-periodic [multi-layered] buffer having at least three layers with each layer having a thickness in the range from 2 nm to 6 nm on a substrate at a first temperature in which the layers alternate between at least two types of compound semiconductors A and B different from each other in lattice constant, energy band gap, layer thickness, and composition; and

forming a MOCVD-grown layer [at a second temperature which is higher than the first] of a group-III nitride [or related] compound semiconductor on the formed multi-layered buffer, wherein said layer of a group-III nitride is formed at a temperature higher than said first temperature.

2. (Once amended) A crystal growth method according to claim 1, further comprising doping a n- or p-type in said group-III nitride [or related] compound semiconductor.

3. (Once amended) A crystal growth method according to claim 1, wherein the compound semiconductors A and B are alternately and periodically grown by MOCVD on said substrate [in the sequence of AB......AB] to form said multi-layered buffer.

4. (Once amended) A crystal growth method according to claim 1, wherein the compound semiconductors A and B are alternatively grown by MOCVD on a substrate [in the sequence of AB......AB varying in thickness of each layer] with the thicknesses of the layers varying from one to another to form a multi-layered buffer.

12. (Once amended) A group-III nitride [or related] compound semiconductor, comprising:

a MOCVD-grown periodic or non-periodic multi-layered buffer having at least three layers with each layer having a thickness in the range from 2 nm to 6 nm on a substrate grown at a first temperature in which the layers alternate between at least two types of compound semiconductors A and B different from each other in lattice constant, energy band gap, layer thickness, and composition; and

a MOCVD-grown layer [at a second temperature which is higher than the first] of a group-III nitride [or related] compound semiconductor on the formed multi-layered buffer <u>wherein said layer of group-III is formed at a temperature that is higher than said first temperature</u>

<u>Add new claims as follows</u>:

13. (New) A method as recited in claim 1 wherein a total buffer thickness is less than 96 nm.

14. (New) A method as recited in claim 1 wherein a total buffer thickness is less than 48 nm.